

Welders, Cutters, Solderers, and Brazers

Table of Contents *(scroll or use links below to navigate document)*

[What They Do](#)

[Tasks](#)

[Skills, Knowledge, and Abilities](#)

[Work Environment](#)

[California's Job Outlook and Wages](#)

[Trends](#)

[Training](#)

[Where Do I Find the Job?](#)

[Where Can the Job Lead?](#)

[Other Sources](#)



[View Career Video](#)

What They Do

Combination Welders perform both arc and gas welding. In arc welding, heat is produced by an electric current. Arc welding is used for large jobs such as fabricated work with heavy plates and large shapes. It is also used in production line and general assembly operations where speed is necessary. Gas welding is done with a flame combining oxygen and acetylene or oxygen and hydrogen gases and is used for small repairs or delicate jobs on light metals or tubing.

Welders use manual, semiautomatic, and automatic arc and gas equipment. They work from blueprints, layouts, and work orders. Their job duties include fabrication and repair of machine parts, motors, trailers, and manufacturing equipment. They repair broken parts, fill holes, cut metal, and increase the size of metal parts.

Welding inspectors interpret and work from procedures, drawings, schematics, and verbal or written instructions. They conduct random visual examinations and test welded joints for defects, correct measurements, joint strength, and weld penetration. Welding inspectors may make minor adjustments as needed.

Solderers and Brazers use molten metal to join two pieces of metal. This differs from welding because the metal added during these processes has a lower melting point than that of the workpiece, so only the added metal is melted, not the workpiece. Soldering is used to join electrical, electronic, and other small metal parts. Brazing uses metals with a higher melting point than soldering. Brazing produces a stronger joint and is used to join metals other than steel. Brazing can be used to apply coatings to parts to reduce wear and protect against corrosion. Skilled welding, soldering, and brazing workers select and set up welding equipment, execute the planned welds, and examine welds to ensure that they meet standards and specifications. Welders are trained to work with a variety of materials in addition to steel, such as titanium, aluminum, or plastics.

The duties of arc Cutters are closely related to that of Welders. But, instead of joining metals, Cutters use the heat from an electric arc, a stream of ionized gas or burning gases to cut and trim metal objects to meet blueprint or work order specifications. Cutters also dismantle large objects, such as ships, railroad cars, automobiles, buildings, or aircraft.

Welders, Cutters, Solderers, and Brazers

Tasks

- ▶ Weld metal parts or components together, using brazing, gas or arc welding equipment.
- ▶ Repair broken or cracked parts, fills holes and increases size of metal parts, using welding equipment.
- ▶ Weld in flat, horizontal, vertical, or overhead positions.
- ▶ Clean or degrease parts, using wire brush, portable grinder, or chemical bath.
- ▶ Inspect finished workpiece for conformance to specifications.
- ▶ Melt and apply solder along adjoining edges of workpieces to solder joints, using soldering iron, gas torch, or electric-ultrasonic equipment.
- ▶ Guide torch and rod along joint workpieces to heat to brazing temperature, melt braze alloy, and bond workpieces together.

Detailed descriptions of these occupations may be found in the Occupational Information Network (O*NET) at online.onetcenter.org.

Important Skills, Knowledge, and Abilities

- ▶ Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.
- ▶ Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- ▶ Operation and Control — Controlling operations of equipment or systems.
- ▶ Arm-Hand Steadiness — The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.
- ▶ Manual Dexterity — The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.
- ▶ Near Vision — The ability to see details at close range (within a few feet of the observer).

Work Environment

Welders, Cutters, Solderers, and Brazers are exposed to a number of hazards including the intense light created by the arc, poisonous fumes, and very hot materials. They are exposed to hot flying flecks that can cause skin burns and set fire to clothing. These workers wear protective gear such as goggles, welding hoods, heavy gloves, and safety shoes to guard against injuries.

Welders and Cutters may work outdoors, exposed to the weather, or indoors in a confined area designed to contain sparks. Outdoors, they may work on a scaffold or platform high off the ground. Physical activities depend upon the type of job and may include lifting heavy objects and equipment, reaching, walking, climbing, stooping, kneeling, and crawling.

Most Welders, Cutters, Solderers, and Brazers work a 40-hour week. However, overtime is common. Some Welders, Cutters, Solderers, and Brazers work in factories that operate around the clock, requiring shift work. At times, they may work in shifts as long as 12 hours.

Some workers may belong to one of the following unions: the International Association of Machinists and Aerospace Workers; the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, and Helpers; the United Automobile, Aerospace, and Agriculture Implement Workers of America; or the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada.

Welders, Cutters, Solderers, and Brazers

California's Job Outlook and Wages

The California Outlook and Wage table below represents the occupation across all industries.

Standard Occupational Classification	Estimated Number of Workers 2004	Estimated Number of Workers 2014	Average Annual Openings	2006 Wage Range (per hour)
Welders, Cutters, Solderers, and Brazers				
51-4121	29,800	33,100	1,170	\$11.37 to \$19.53

Wages do not include self-employment.

Average annual openings include new jobs plus net replacements.

Source: www.labormarketinfo.edd.ca.gov, Employment Projections by Occupation and OES Employment & Wages by Occupation, Labor Market Information Division, Employment Development Department.

Trends

Welders, Cutters, Solderers, and Brazers occupations are expected to grow slower than average for all occupations over the 2004-2014 projections period. Many companies are investing more in automation to cut labor costs. This will reduce the demand for some low-skilled Welders, Cutters, Solderers, and Brazers because the simple, repetitive jobs are being automated. However, opportunities will continue to exist because technology is helping to improve welding, creating more uses for welding in the workplace.

Training/Requirements/Apprenticeships

Welders, Cutters, Solderers, and Brazers usually follow one of the following training paths:

- ▶ Formal, four-year apprenticeship
- ▶ Vocational school
- ▶ Community college programs or certificates
- ▶ Extensive on-the-job training

Training for Welding, Cutting, Soldering, and Brazing workers can range from a few weeks of school or on-the-job training for low-skilled positions to several years of combined school and on-the-job training for highly skilled jobs. Formal training is available in high schools, vocational schools, and postsecondary institutions, such as vocational-technical institutes, community colleges, apprenticeship programs, and private welding schools. Welders must be licensed through the Contractor's State License Board for jobs in which failure of welds can be dangerous.

Voluntary certification for Welders is available through the American Welding Society (AWS). The AWS also offers a written examination process to certify welding inspectors. Inspectors recertify every nine years by taking a written examination.

Welders, Cutters, Solderers, and Brazers

Recommended High School Course Work

High school preparation courses in blueprint reading, shop mathematics, mechanical drawing, physics, chemistry, and computer programming are helpful.

Where Do I Find the Job?

Direct application to employers remains one of the most effective job search methods. Candidates for training or apprenticeship programs should apply directly to employers who employ Welders, Cutters, Solderers, and Brazers. Community colleges offer assistance in finding jobs to graduates of degree or certificate programs in tool and die making or machine shop. Unions representing Welders also have information concerning apprenticeships and related matters.

Use the *Search for Employers by Industry* feature on the *Career Center* page at www.labormarketinfo.edd.ca.gov to locate employers in your area. Search under the following industry names to get a list of private firms and their addresses:

- ▶ Employment Placement Agencies
- ▶ Fabricated Structural Metal
- ▶ Metal Window and Door
- ▶ Motor Vehicle Body
- ▶ Ornamental and Architectural Metal Work
- ▶ Plate Work
- ▶ Professional Employer Organizations
- ▶ Sheet metal Work
- ▶ Temporary Help Services
- ▶ Travel Trailer and Camper
- ▶ Truck Trailer

Search these **yellow page** headings for listings of private firms:

- ▶ Welding
- ▶ Welding Certification
- ▶ Welding Inspection and Consulting

Where Can the Job Lead?

With additional training and experience Welders may advance to welding supervisors, instructors, or inspectors. Many employers prefer to hire certified welding inspectors. Some experienced Welders may open their own repair shops.

Other Sources of Information

Contractors State License Board
www.cslb.ca.gov

American Welding Society
www.aws.org